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THE ADMINISTRATION OF A PROCAINE PENICILLIN FEEDING SUPPLEMENT TO "RUNT" PIGS

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INTRODUCTION

The value of antibiotic feeding supplements in the rearing of unthrifty or "runt" pigs in the U.S.A. has been referred to by Shanks (1952), who has recorded the successful use of an aureomycin fermentation product ("Aurofac," Lederle) for a similar purpose on farms in the North of Scotland area. Shanks, moreover, has provided a clear description of the type of unthriftiness that was found to benefit from aureomycin administration.

The purpose of this communication is to place on record the value of a procaine penicillin feeding supplement, combined in this instance with vitamin B_{12}, in rearing runt pigs on a farm in Buckinghamshire. The experiment formed an adjunct to a controlled feeding trial with normal animals, which was one of a series of investigations that we have been conducting with procaine penicillin and other antibiotic supplements. In view of the successful results obtained with the runt animals it is of interest that, in the main trial on the farm in question, the response of normal pigs to the procaine penicillin supplement was not impressive. The farm is one on which high standards of feeding and management are maintained, accurate records are kept as routine, and which has enjoyed many successes at shows and in carcase competitions. It is now well recognised that the response of apparently normal pigs to antibiotic feeding supplements varies from farm to farm. There is likewise considerable variation in the response of chicks (see Cuthbertson, 1952), in which it has been postulated that, in some cases at least, an infectious condition, described as "the inability to grow maximally in the absence of antibiotics," is responsible. In their studies of this condition, Coates, Dickinson, Harrison, Kon, Porter, Cummins and Cuthbertson (1952) have been unable to demonstrate any abnormality in affected birds other than a depression of growth that is overcome by dietary penicillin. The condition may be transmitted from bird to bird without direct contact between them. Presumably the condition is linked with variations in the prevailing bacterial flora of the gut, and any response to the parenteral administration of penicillin is probably due to excretion of the antibiotic into the intestine; indeed, some workers have failed to influence the growth of chicks by the injection of penicillin, although they have obtained satisfactory results from oral dosage (Groschke & Evans, 1950). At the present time it is commonly believed that similar mechanisms operate in the case of pigs. Whether runt animals that respond to antibiotics are to be regarded as advanced cases of this imperfectly defined infectious condition is a matter for conjecture, but there is every reason to suppose that disturbances of the gut flora are concerned.

MATERIALS AND METHODS

The main feeding trial, and also the experiment with runt animals, were conducted with Large White pigs bred on the Buckinghamshire farm mentioned above. In order to provide background data, a brief description of the design and results of the main trial is incorporated.

Procaine Penicillin Supplement.—The supplement was prepared by the Distillers Company (Biochemicals), Ltd., and was standardised to contain 1 gramme of procaine penicillin per lb. The base on which it was prepared consisted of dried distillery residues, of which an average sample was found to comprise: moisture, 2·6; protein, 52·6; fat, 0·8; N-free extractives, 42·1; fibre, 6·7; and ash, 2·1 per cent. The amounts incorporated in the diet are indicated below.

Vitamin B_{12} Supplement.—This also was prepared by the Distillers Company and was standardised to contain 15 μg. per gramme. The base of distillery residues was identical with that employed for the procaine penicillin supplement. Although the vitamin B_{12} had been obtained from the fermentation of *Streptomyces griseus*, the supplement contained virtually no streptomycin, an assay of the batch employed giving a value of only 10 units per gramme. The amount incorporated in the diet was 2 lb. supplement per ton of feed, *i.e.*, approximately 6 μg. vitamin B_{12} per lb. of food consumed.

Basal Diets.—From the commencement of the experiment with runt pigs on September 17th, 1951, and of the main feeding trial on September 24th, 1951, until November 12th, 1951, the following basal ration was employed for all groups:—

Weatings ...	... 50	Bran ...	... 10
Barley ...	... 30	Flake maize	... 5
	Fish meal ... 5		

From that date until slaughter the diet was modified to contain:—

Weatings ...	... 39	Bran ...	... 9·5
Barley ...	... 39	Flake maize	... 5
	Fish meal ... 7·5		

In addition, a mineral mixture was provided throughout.

FEEDING TRIAL WITH NORMAL PIGS. Five groups, each of eight pigs, were selected from over 150 weaners available. The animals were grouped in order to balance so far as possible for sex and litter of origin, and were all approximately 73 days of age when the trial began on September 24th, 1951. The groups received supplements as follows:—

Group I.—Procaine penicillin supplement at the rate of 2 lb. (*i.e.*, 2 grammes procaine penicillin) per ton of food; plus vitamin B_{12}.

Group II.—Procaine penicillin supplement at the rate of 4 lb. (*i.e.*, 4 grammes procaine penicillin) per ton of food; plus vitamin B_{12}.

Group III.—Procaine penicillin supplement at the rate of 8 lb. (*i.e.*, 8 grammes procaine penicillin) per ton of food; plus vitamin B_{12}.

Group IV.—Control group, receiving supplement of vitamin B_{12} only.

Group V.—"Withdrawal group," receiving procaine penicillin supplement as in Group III (*i.e.*, 8 grammes procaine penicillin per ton) for six weeks only, the supplement then

being withdrawn suddenly. Vitamin B_{12} was continued throughout.

The five groups were maintained in adjacent large pens in the same building and were fed twice daily. A record of group food consumption was kept and the animals were weighed weekly. The floor-heaters of the sties were switched on at the beginning of October. At the completion of the experiment the pigs were consigned to Messrs. T. Walls bacon factory at Willesden, where we had the expert co-operation of Mr. Collan E. Brett and his staff in measuring and grading the carcases and in obtaining samples of back fat for chemical analysis.

The normal method of feeding on this farm is to combine meal with concentrated kitchen waste. In some earlier

Fig. 1.—Pig 3256 at 10 weeks of age, weight 16 lb.

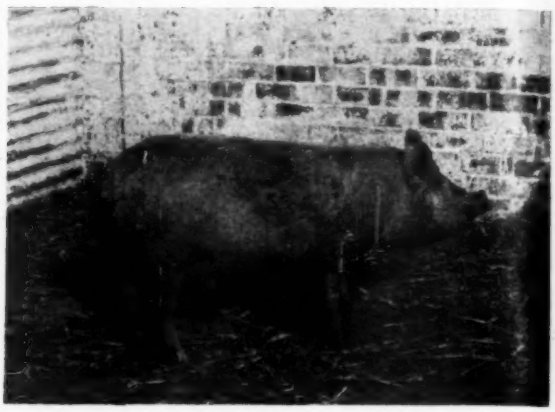

Fig. 2.—Pig 3256 prior to slaughter at 27 weeks of age, weight 234 lb.

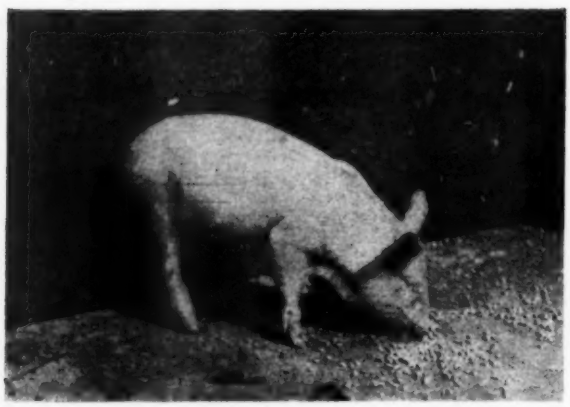

Fig. 3.—Pig 3289 at 10 weeks of age, weight 14 lb.

Fig. 4.—Pig 3289 prior to slaughter at 27 weeks of age, weight 207 lb.

Fig. 5.—Pig 3291 at 10 weeks of age, weight 16 lb.

Fig. 6.—Pig 3291 prior to slaughter at 27 weeks of age, weight 209 lb.

experimental work we had observed less satisfactory weight gains when an all-meal ration was provided. In order to check this point a pen of hog pigs, litter-brothers to some of the animals in Groups I to V, was selected by the farm manager and maintained on the normal system of feeding and weighed at intervals during the trial. As indicated later, these additional observations were uncontrolled, but they are nevertheless included as a matter of interest.

RUNT EXPERIMENT. From the litters available, 10 typical runts were selected and were grouped together in one pen after weaning. They would not normally have been retained for fattening purposes owing to their low weights. They were provided with the basal diet supplemented with procaine penicillin supplement at the rate of 8 lb. (*i.e.*, 8 grammes procaine penicillin) per ton, and with vitamin B_{12}. As the accompanying photographs indicate, the animals were markedly unthrifty, and at the commencement of the experiment on September 17th, 1951, when their ages lay between 66 and 70 days, their bodyweights ranged from 11 to 23 lb., the average being 15·7 lb. The management and records were similar to those in the main trial, but owing to discrepancies in the time of attaining bacon weight the first six pigs only could be consigned to Willesden. Of the remainder, three were consigned to the premises of Messrs. Mason & Gillett, Ltd., Cirencester, to the manager of which we are greatly indebted for the carcase data given below.

RESULTS

Main Feeding Trial.—A more detailed account of the results with normal pigs will be given in a later paper embodying the results of several such trials on farms in different areas and with varying conditions of management. During the first seven weeks of the experiment (*i.e.*, to November 12th, 1951), during which critical period of growth the maximum effect of the antibiotic supplement would have been anticipated, the group results were as follows :—

Group	Average weight (lb.) at 24.9.51	Average weight (lb.) at 12.11.51	Average gain (lb.)	Food consumption (lb.) per 1 lb. live weight gain
I (2 grammes penicillin per ton) ...	35·6	79·5	43·9	2·55
II (4 grammes penicillin per ton) ...	35·2	78·5	43·3	2·59
III (8 grammes penicillin per ton) ...	35·1	78·7	43·6	2·81
IV (control group)...	35·5	77·2	41·7	2·77
V (8 grammes penicillin per ton for six weeks only) ...	35·4	82·4	47·0	2·61

The average daily gain for the four supplemented groups during this part of the experiment was 0·91 lb., whereas that for the control groups was 0·85 lb.

The hog pigs that had received the meal + kitchen waste diet during this period showed individual weights as follows, in comparison with their littermates in the supplemented groups, when weighed on November 12th, 1951 :—

Hog pigs receiving kitchen waste + meal	Littermate controls from penicillin experiment
83 lb.	60 lb. (Group I)
92 „	100 „ („ II)
90 „	73 „ („ II)
93 „	80 „ („ II)
87 „	65 „ („ II)
102 „	94 „ („ III)
97 „	80 „ („ V)
94 „	75 „ („ V)

The initial weights of these hog pigs were, unfortunately, not recorded, but they were selected by the farm manager as comparable animals to those in the experiment proper. Their permitted food consumption even during these early stages of fattening had been greater than that of the experimental pigs, but it would appear, nevertheless, that the addition of procaine penicillin had not rendered an all-meal diet as effective for normal growing pigs as the meal + kitchen waste diet customarily fed on this farm. This was in marked contrast to results obtained on other farms in the same county with apparently normal pigs of the same breed, and suggested that the beneficial results obtained with runt pigs were unrelated to any generalised " inability to grow maximally in the absence of antibiotics " in pigs on the farm in question.

The progress of the experimental pigs subsequently, and the carcase gradings attained, were satisfactory, the best results being obtained in the case of Group V. For present purposes the final data may be summarised as follows :—

	Average daily live weight gain (lb.)	Food consumption (lb.) per 1 lb. live weight gain
Group I	1·13	4·05
„ II	1·17	3·91
„ III	1·18	3·89
„ IV	1·11	3·99
„ V	1·22	3·71

Runt Pigs.—During the initial period progress was slow but definite ; any tendency to scouring was controlled and it soon became evident that, with one possible exception, the 10 animals would attain bacon weight in a time that would render the experiment economically justifiable. As already indicated, the experiment began on September 17th, 1951, *i.e.*, one week earlier than the main feeding trial, the average individual weight then being only 15·7 lb. By November 12th, 1951, the average weight had risen by 40·1 lb., a gain of 24·4 lb., or 0·435 lb. per day. Food consumption to this date was 2·88 lb. per lb. live weight gain.

Progress thereafter, in all but one case, was remarkably good, and by March 26th, 1952, it was possible to consign six of the animals to the bacon factory. At this date the individual weights were as recorded in the following table :—

Pig (ear No.)	Weight at 17.9.51 (lb.)	Weight at 26.3.52 (lb.)	Total gain (lb.)	Daily gain (lb.)
3291	16	209	193	1·01
3268	15	169	154	0·81
3304	23	201	178	0·93
3289	14	207	193	1·01
3283	12	194	182	0·95
3292	11	105	94	0·49
3306	16	163	147	0·77
3300	17	220	203	1·06
3256	16	234	218	1·14
3310	17	212	195	1·02
	157	1,914	1,757	0·92

The food consumption for the group from the commencement to March 26th, 1952, was 6,413 lb., *i.e.*, 3·65 lb. meal per 1 lb. live weight gain. Subject to satisfactory carcase quality this indicated that the venture had been thoroughly justified economically.

The six animals exceeding 200 lb. live weight were examined after slaughter on March 28th, 1952. The data obtained are set out in the following table :—

Pig (ear No.)	3291	3289	3300	3256	3310	3304
Cold weight (lb.)	152	148	161	174	156	143
Length (mm.)	792	787	821	824	778	785
Marks for ditto (max. 10)	5	7	6	4	4	6
Shoulder fat (mm.)	51	38	45	52	45	52
Marks for ditto (max. 15)	6	12	10	8	9	4
Loin fat (mm.)	18·5	15	22	37	24·5	29·5
Back fat, B (mm.)	18·5	16·5	18	33	21	22·5
Streak—fore (mm.)	22	35	35	29	28	28
	23	26	29	28	32	31
mid (mm.)	25	25	31	29	32	27
	21	21	26	27	33	25
hind (mm.)	17	26	27	28	37	27
	21	25	30	26	29	21
average (mm.)	21	29	31	29	32	27
	22	24	28	27	31	26
Marks for ditto (max. 10)	1	4	4	3	6	4
Total marks (max. 35)	12	23	20	15	19	14
T (mm.)	24·05	23·45	25·40	27·33	24·64	22·71
B — T (mm.)	−5·55	−6·95	−7·40	+5·67	−3·64	−0·21

In the above table the value T, the expected measurement of back fat in mm., is calculated from the equation $T = 1{\cdot}4 + 0{\cdot}149\ W$, where W is the weight of the cold carcase in lb. (see Callow, 1942 ; Worden, 1948). B represents the actual back fat measurement and the expression B — T therefore gives the difference between the found and calculated values. Thus in this group of six animals, the actual measurements were in four instances leaner and in one instance fatter than expectation, the remaining measurement being almost exactly equal to the calculated value.

We were unable to inspect the carcases of the three further pigs consigned for slaughter on May 3rd, 1952, but we were provided with the accompanying data and were able to calculate the values of T and B — T accordingly :—

Pig (ear No.)	3283	3306	3268
Cold carcase weight (lb.)	162	152	159
Loin fat (mm.)	33	35	17
Back fat, B (mm.)	29	27	16
Shoulder fat (mm.)	62	52	44
Marks for ditto (max. 15)	2	5	10
Grading	B (too fat)	A (good)	L (too thin)
T (mm.)	25·54	24·04	25·09
B — T (mm.)	+3·46	+2·96	−9·09

Thus two of these animals were slightly fatter and one considerably leaner than expectation.

The remaining animal, No. 3292, was not followed through to the slaughterhouse although it also eventually attained bacon weight and was graded.

Samples of loin fat, both inner and outer, were collected from each of the first six animals to be slaughtered, and the iodine numbers were determined. The mean values for the inner and outer layers were 69·7 and 70·3 respectively. These values were several points too high, indicating a somewhat softer fat than is desirable (see Lovatt, Worden, Pickup & Brett, 1948).

Discussion

The gratifying response of runt pigs to the procaine penicillin feeding supplement indicates that the latter should prove of decided economic value when the sale of antibiotics for this purpose becomes permissible, for the availability and price of the product are likely to favour its widespread use in Great Britain. Although the carcases of the "recovered" animals were naturally not of the first grade, they nevertheless bear comparison with those obtained in current litter-testing trials. Moreover, food conversion ratios were excellent, and the runts were marketed in a manner that repaid the farmer. It seems of significance that the results were obtained on a farm where hygiene and management were excellent and on which normal pigs of the same breed did not show any marked response to the feeding of procaine penicillin. Therefore, there did not appear to be any generalised condition in the stock of "inability to develop maximally in the absence of antibiotics." Such a condition, comparable to that recognised in poultry, may well exist on other farms at which apparently normal pigs respond to the administration of procaine penicillin or other antibiotics.

From the veterinary standpoint, it may be important to recognise which "runt" pigs are likely to respond to an antibiotic feeding supplement, or even to antibiotic therapy. The description provided by Shanks (1952) has already been referred to, and generally speaking, it might be assumed that all cases associated with enteric disturbances are suitable subjects for oral administration. As Blount (1952) points out, however, the provision of antibiotic feeding supplement for a runt that was due to an infection of the lungs, kidneys or other organs would probably prove valueless.

There is the further question of the runt that is too young or too weak to benefit from the provision of a food supplement, even as part of the creep-feed. Many runts would be dead several weeks younger than the age at which our animals were put on experiment. Shanks (1952) has found that the forcible administration of small doses of an aureomycin feeding supplement, sufficient to provide approximately 0·0013 g. aureomycin, may cause cessation of scouring within 24 hours in the case of piglets that are too young to take solid food voluntarily. It may be of interest in this connection to mention that MacPherson (1952), to whose experiments we have permission to refer, recently has had similar successes from squirting the contents of an intramammary tube (containing either procaine penicillin or streptomycin formulated for mastitis therapy) into the mouth of the piglet. It is of interest also that in the U.S.A. systems of weaning at 48 hours and subsequent successful rearing on "synthetic milks" containing an appropriate level of antibiotic have been devised, following the experiments of Nesheim, Krider and Johnson (1950), Wahlstrom and Johnson (1951) and others. It would seem that baby pigs so treated will thrive successfully provided that the diet contains sufficient available energy and an effective antibiotic.

Although the animals in our own experiments were receiving a feeding supplement containing vitamin B_{12}, we have little reason to suppose that it played any significant part in the results obtained, for the diet otherwise almost certainly contained adequate amounts of vitamin B_{12} and other components of "animal protein factor."

Summary

(1) A group of 10 "runt" Large White pigs, ranging in weight from 11 to 23 lb. at 67 to 70 days of age, was successfully reared when the all-meal ration was fortified with an antibiotic feeding supplement providing 8 g. procaine penicillin per ton of food consumed. At the end of 191 days, by which time six members of the group had exceeded 200 lb. live weight, the average daily gain was 0·92 lb. and the food consumption 3·65 lb. per lb. live weight gain. The remaining members of the group subsequently attained bacon weight and were graded.

(2) Details of carcase measurements and gradings are given. Although the mean iodine number of the loin fat of the first six animals to be slaughtered was 69·7 (inner) and 70·3 (outer), carcase quality was in all cases sufficient to justify the venture.

+ Correction made according to Errata - p. 722

(3) Controlled feeding trials on the same farm did not indicate any marked response of normal pigs of the same breed to the procaine penicillin feeding supplement.

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THE DAIRY SHOW

British Friesians' Winning Way

The total attendance for the four-day annual show of the British Dairy Farmers' Association dairy show at Olympia, which ended on Friday of last week, was 79,777, compared with 77,540 last year. The Friesians and Ayrshire breeds had the strongest representation at the show, but there were also some well-filled classes of Dairy Shorthorns, Jerseys, Red Polls, and Guernseys. South Devons, Lincoln Red Shorthorns, and Dexter were the other breeds in a display of the dual-purpose types. Early selections made by judges suggested that in spite of a strong challenge from Ayrshire competitors, the Friesian breed would maintain its supremacy in the prize lists, and this proved to be so. For the fifth time in succession the British Friesian breed won the Bledisloe trophy for the six best all-round dairy cows judged on results of milking trials and inspections. The Friesians were so far ahead of their rivals in the milking trials that their production marks outweighed a loss of points when the breed teams were judged on inspection. In that test the Dairy Shorthorns were placed first, the Ayrshires second, and the Friesians third. The Duke of Beaufort, President of the British Dairy Farmers' Association, presented the trophy. Lord and Lady Bledisloe and Sir Thomas Dugdale, Minister of Agriculture, were among the large crowd who watched the judging.

On the following day the successes of the British Friesians were crowned by achievements in the competition for the British Dairy Farmers' Association's supreme individual championship trophy. Animals of the breed gained both the award and the reserve placing. British Friesians had previously won the trophy for the best group all-round dairy cows and secured four other major awards. This competition was between animals of the Dairy Shorthorn, British Friesian, Ayrshire, Jersey, South Devon, Guernsey, Red Poll, Lincolnshire Red Shorthorn, and Dexter types, and was decided on results of inspection and milking trials. The Friesian pair were fourth and fifth in the final line-up after inspection, the judge preferring Shorthorn, Ayrshire, and Jersey exhibits, in that order, for the preceding places. Friesian predominance was established after points gained in the milking trials were added to scores made in the inspection.

The winning entry was Terling Judy 74th, shown by Lord Rayleigh's Farms Inc., of Hatfield Peverel, Essex. The reserve selection was Claybury Bacchus Beotia, shown by C. E. B. Draper and Son, Ltd., of Alton Burnell, near Shrewsbury.

The trophy was presented by the Duchess of Beaufort.

CLINICAL COMMUNICATION

CAESAREAN SECTION IN THE EWE

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Introduction

Within recent times several authors have reported the performance of caesarean section in the ewe with varying results. Farquharson (1941) described the successful outcome of one such operation. Wright (1950) records three cases, all of which died. Milne (1951), working in America, operated on five cases, two of which survived. The most successful record to date is that of Harmer and Mount (1951), who lost only two of the 11 ewes operated upon. More recently Arthur (1952) has reported a successful result in one case. The indications for caesarean section in this part of the country occur frequently, and in view of the successes obtained by the method adopted in performing the operation, it is considered worth while placing on record the indications for and the outcome of 26 cases so far operated upon.*

Indications

The indications for which the operation was performed were as follows :—

1. Partial dilatation of the cervix (so-called ringwomb).
2. Prolapse of the cervix, labour not having commenced.
3. Prolapse of the cervix, labour having commenced.
4. Miscellaneous indications.

(1) Partial Dilatation of the Cervix

In the case of a normal lambing, the cervix is almost fully dilated at the time of rupture of the amnion. Partial dilatation of the cervix is considered to be in existence when the amnion has ruptured and vaginal examination reveals a cervix which is tense, hard and ring-like (hence the term " ringwomb "), and one which shows no signs of relaxing on manipulation. Experience has shown that a cervix in such a state never dilates fully even after a reasonable period of time is allowed for it to do so, and thus one considers that partial dilatation of the cervix exists and caesarean section is called for to obviate the loss of both the ewe and lambs. Brownlie (1952) has stated that epidural anaesthesia will allow such a cervix to dilate, but, as will be shown later, while this is the author's anaesthetic method of choice, so far no case has been encountered where such anaesthesia has caused sufficient dilatation of the cervix to deliver a lamb in the normal way.

(2) Prolapse of the Cervix (Labour not having commenced)

Whilst the condition may occur at any time towards the end of pregnancy, its most frequent occurrence would seem to be within a period of 14 days before lambing. In such cases as these, an attempt is first made to return the prolapsed cervix after the bladder has been evacuated, by inserting vulval sutures. This method, however, is unsatisfactory as gross tearing of the vulva frequently occurs consequent upon the ewe straining to micturate. Following the suturing of the vulva, time is given to see whether the ewe will retain the returned cervix, but it is only occasionally that retention lasts for any length of time. Results have shown, however, that an attempt to return the prolapsed cervix is well worth while,

* Since writing the article, a Clinical Communication has been published by Mackinnon and Baylis. (1952.) *Vet. Rec.* **64.** 512.

because the nearer the ewe gets to full term before one operates, the greater are the chances of the lambs surviving, for not only is mammary activity, *i.e.*, milk secretion, delayed until a few days before uterine contractions commence, but caesarean section does not stimulate the ewe to "spring into milk" if performed before the natural letting-down of the milk. Thus, if the operation were performed at the time of the prolapse it would necessitate the hand-feeding or fostering of the lamb. One must also take into consideration the fact that the vigour of the lambs on removal from the uterus is greater the nearer the ewe gets to full term. Consequently, the operation is delayed until parturition is imminent, this being assessed by the stance of the ewe and the structural changes of the mammary glands as shown by increased turgidity and the expression of colostrum from the teats.

(3) Prolapse of the Cervix (Labour having commenced)

This type of prolapse is differentiated from the previous condition by the fact that a number of cases of prolapse of the cervix are seen shortly after the commencement of labour. On reducing such a prolapse one finds that the cervix is only partially dilated and never subsequently dilates fully; thus the condition necessitates a caesarean section.

(4) Miscellaneous Indications

Under this heading one includes such cases as foetal dystokia—consequent upon gross abnormalities of the foetus, such as anatomical abnormalities, size of the foetus, and the presence of emphysema and hydrops amnii. Milne records the performance of the operation in cases of *Schistosomus reflexus* and rupture of the uterus.

Some authors have advocated caesarean section as a method of treatment of pregnancy toxaemia in ewes. Three such cases have been operated upon. In two, the ewes were in the advanced stage of the condition and died within 12 hours of the operation. In both cases the *post-mortem* findings showed the livers to be in a very advanced stage of fatty degeneration, and the writer is of the opinion that the liver changes which accompany pregnancy toxaemia are such that they are detrimental to the ewe's subsequent recovery from the operation. In the other case operated upon, a ewe in the early stages of the condition recovered but developed blindness 36 hours afterwards. In all three cases the lambs, numbering seven, were alive on removal from the uterus but were very lethargic and succumbed within a few hours.

Procedure Adopted

It is the frequent custom in this practice for farmers to bring ailing sheep to the surgery for diagnosis and treatment and this is particularly the case with difficult lambings, for not only is it more convenient and economical to the farmer, but it permits one to work under somewhat ideal conditions, especially as regards lighting, availability of hot water and hygiene generally.

Anaesthesia.—Several anaesthetics, such as nembutal, sodium pentothal, chloroform, ether and combinations of these, have been tried, and whilst they have no detrimental effect upon the ewe, in many cases the lambs extracted from the uterus died from the effects of such anaesthetics. To overcome this the author resorted to epidural anaesthesia, which, from the results obtained, would appear to be quite harmless to the ewe and does not have any ill-effects upon the lambs. This method of anaesthesia also allows the lambs to be returned immediately to the ewe on completion of the operation. Anavenol K, as used by Harmer and Mount (1951), has not been tried.

The anaesthetic used is a 2 per cent. solution of procaine, 4 to 6 c.c. of the solution being injected into the lumbosacral junction, using No. 19 Agla needle. The ewe is restrained in the normal standing position, and the site plucked of wool and cleansed with spirit. The site for the insertion of the needle is that described by Wright (1950) and is located by feeling the anterior borders of the ilium. A line joining them crosses the spinal processes of the last lumbar segment and the needle is inserted in the mid-line immediately behind the spine. In no instance has the author encountered cerebro-spinal fluid, as mentioned by Wright. In all cases satisfactory anaesthesia has been obtained which lasts for about an hour.

Having satisfactorily anaesthetised the ewe, an area surrounding the operation site is plucked of wool and cleansed with a 1 per cent. cetavlon solution, followed by surgical spirit.

Restraint.—The ewe is restrained on her back on a normal size small-animal operating table. It has been found beneficial to raise the head end of the table some 6 to 8 inches, thus placing the ewe on an incline, as this prevents any tendency to regurgitation of the ruminal contents and, also, overcomes the possibility of the spinal anaesthetic ascending too far up the spinal canal. The hind limbs of the ewe are secured by means of webbing hobbles, whilst the head and forelimbs are restrained by an assistant. Restrained in this way, the ewe rarely moves during the course of the operation.

Technique of Operation

This follows closely that described by Wright (1950). An incision is made through the abdominal wall about 2 inches to the left of the mid-line and medial to the left mammary vein, extending forwards from a point 2 inches in front of the udder for a distance of 6 inches. The muscle layers are incised to expose the relatively thin peritoneum which is incised, the uterus being guarded by means of a director. The uterus is then brought into the wound and the foetus held through the uterine wall. In cases of posterior presentation, and these represent about 90 per cent. of cases, the foetus is held by the hock through the uterine wall and the latter is then incised over the hock for a distance of 6 inches, avoiding the cotyledons (Fig. 1). The foetal membranes are next incised thus exposing the hock, of which direct hold is now taken (Fig. 2). The uterus is held in the wound by an assistant whilst the operator withdraws the foetus (Fig. 3). In the early cases operated upon it was noticed that some of the lambs had great difficulty in breathing properly and this was thought to be due to the fact that the majority of lambs which are extracted backwards are stimulated to breathe by the lowering of the temperature on their hind quarters, whilst the head is still *in utero*, with the result that the lambs inhaled amniotic fluids. It was found that this could be overcome by placing a warm sterile cloth over the hind quarters during extraction.

In cases of anterior presentation (Fig. 4) considerable difficulty is experienced in withdrawing the foetus. In these cases it is necessary to incise the uterus over the foetal neck and remove the foetus by traction on its head, the length of the neck adding to the difficulty of extraction. When twin lambs are present they are removed independently from their respective cornu by separate incisions.

Immediately the lambs are extracted they are taken care of by an assistant, who stimulates them to breathe. In cases where there is excessive mucus in the mouth and nostrils, this is removed by swinging the lamb pendulum-fashion, holding it by the hind legs. The lambs are kept warm until the ewe is ready to receive them, this being done by placing them in a warm oven.

After the extraction of the lambs, the foetal membranes are trimmed off with scissors and the remainder returned to the cornu. It has been found that at this stage the foetal membranes are difficult to remove as they do not separate easily and it is considered best to let them separate naturally, this being assisted by the insertion of a compron pessary. The uterus is closed by means of a continuous Lembert suture using medium chromic catgut. In cases of putrified lambs, and where peritonitis exists, a tube of intramammary penicillin is squeezed along the length of the uterine incision after suturing. The muscles and peritoneum are sutured together with a No. 4 catgut, using interrupted sutures, one

Fig. 1.—Exposure of uterus showing posterior presentation. Gripping the hock as described in text.

Fig. 2.—Uterus incised showing hind leg being withdrawn.

Fig. 3.—Whole lamb exposed.

Fig. 4.—Anterior presentation, showing head and forelimbs exposed.

or two tension sutures being inserted. The skin wounds are closed with interrupted No. 6 nylon sutures and the incision "faced" over with propamidine jelly.

The ewe is removed from the operating table and placed in a clean loose-box and then introduced to her lambs. She is usually recumbent for a varying period of time but often will mother her lambs before standing. The duration of the operation is about 40 minutes.

Post-operative Treatment

This depends to a large extent on the rate of expulsion of the foetal membranes, which usually follows within 12 hours. Should this not take place, 100,000 units of distaquaine penicillin intramuscularly are given daily for four days. Following expulsion of the foetal membranes the ewe is returned to the farm and turned out to graze in a paddock convenient to the house. She is housed at night, for about one week. No special diet is allowed, the ewe being fed as for the flock. The sutures are removed on or about the 10th day. It has been noticed that stitch abscess formation is more common when the ewes are turned out than if they are confined to a clean box. It is considered advisable, however, that the ewes be allowed out to graze as they will often feed at pasture, whereas if kept in they will not feed at all and recovery is much slower and very little milk is produced.

Prognosis

The survival of the ewe is, to a large extent, also dependent upon the rapidity with which the foetal membranes are expelled, and the method to ensure this end has already been described. In cases classified under indications (1) and (3) above, the prognosis is excellent, for both ewes and offspring, provided the case is presented and operated upon early, *i.e.*, before or soon after the rupture of the amnion. In protracted cases the prognosis is unfavourable for the ewe and is definitely poor for the lamb. It may be taken that the survival rate among lambs is inversely proportional to the length of time the ewe has been in labour. Where the amnion has been ruptured for some 12 to 24 hours, the survival of the ewe is still likely, but invariably the presented lamb will be dead. If a twin lamb is also present, the possibility is that this will survive. In cases where the amnion has been ruptured for more than 24 hours it is highly probable that both ewe and lamb will die.

In cases classified under (2) the prognosis in both ewes and lambs is excellent; in three such cases operated upon, six live lambs were delivered and all survived.

In cases of pregnancy toxaemia, the prognosis is unfavourable. It is the writer's belief that the damage to liver tissue

has already taken place and is irreparable. The lambs also seem to be in an advanced state of toxaemia. The only case of foetal dystokia operated upon was that of an anasarcous monstrosity, which developed in a uterus the wall of which was grossly oedematous. Owing to the state of the organ it was considered that further operative procedure would be futile and consequently the ewe was destroyed. In another case of oedema of the uterine wall, a single strong healthy lamb was delivered which survived, but two days after the operation the ewe succumbed from metro-peritonitis, consequent upon failure of the oedematous wall of the uterus to heal.

Indications	No. of ewes operated upon	No. of ewes which survived	No. of ewes that died	Cause of death	No. of lambs dead on delivery	No. of lambs alive on delivery	No. of live lambs delivered and survived
Partial dilation of the cervix (as 1)	13	10	3	Pre-existent metro-peritonitis	5	20	14
Prolapse of the cervix (as 2)	3	3	0	—	0	6	6
Prolapse of the cervix (as 3)	5	5	0	—	4	7	2
Miscellaneous (as 4)							
(*a*) Pregnancy toxaemia	3	1	2	Pregnancy toxaemia	0	7	0
(*b*) Anasarcous foetus	1	0	1	Destroyed as explained in text	1	0	0
(*c*) Oedematous uterus	1	0	1	Died of peritonitis due to the failure of uterus to heal	0	1	1
	26	19	7		10	41	23

Comments

The above figures show that seven ewes died subsequent to the operation, and out of 51 lambs delivered 23 survived. Whilst these figures are about 50 per cent., it is felt that these results for both ewes and lambs can be improved upon, especially as most of the deaths occurred in the early cases and the choice of anaesthetic had to be decided, and, also, when farmers are educated to present for operation, as early as possible, their ewes which are having difficulty in lambing.

Conclusions

(1) The operation can be performed with ease at the surgery under ideal conditions and in a reasonable time.

(2) If the cases are operated upon early a 73 per cent. survival of ewes should be obtained ; this takes into consideration that some of the cases necessitating caesarean section may have a metro-peritonitis before being presented.

(3) The anaesthetic of choice is epidural anaesthesia, which is easy to apply and has no detrimental effect on either the ewe or the lamb.

(4) The fact that 73 per cent. of ewes can be saved as well as a high proportion of lambs, makes the operation an economical one.

(5) Whether the operation has any detrimental effect upon the breeding capacity of the ewes remains to be determined.

ANNOTATION

VITAMIN B_{12}, ANIMAL PROTEIN FACTOR AND ANTIBIOTICS IN ANIMAL NUTRITION

The identification of vitamin B_{12}, its recognition as a component of so-called animal protein factor, and the realisation that aureomycin and other antibiotics given by mouth are capable, in certain circumstances, of stimulating growth are all findings that have deservedly attracted widespread attention. A brief account of the extraordinary sequence of events that led to the identification of vitamin B_{12} with A.P.F. has already been given in these columns (Worden, 1951), while those who are interested in vitamin B_{12} and its clinical applications are referred to the extensive reviews of Lester-Smith (1951) and Ungley (1951).

The nutritional effect of antibiotics was first discovered because the residues from the manufacture by fermentation processes of antibiotics were used as a source of A.P.F. It was found that those containing significant traces of antibiotics were more active than could be accounted for by the level of vitamin B_{12}, and subsequently it was clearly demonstrated that the purified antibiotics were themselves capable of stimulating growth. It has recently been emphasised by Wakelam (1952) that the effects of antibiotics and vitamin B_{12} are entirely separate and are, in fact, additive.

In the large maize-growing areas of the U.S.A., where, generally speaking, animal protein supplements have been less freely available than in this country, and where even "all vegetable-protein rations" are encountered, the effect of vitamin B_{12} supplementation is usually clear-cut in appropriate circumstances. In Great Britain with its highly organised fishing industry and relatively short distance from any point to the sea, the use of fishmeal in pig and poultry feeding is now almost traditional. Although there are still rationing measures that limit the supplies of fishmeal, the farmer is able to purchase off-ration condensed fish solubles which are a potent source of vitamin B_{12} and which have been shown in controlled feeding trials with poultry to yield excellent results as a replacement for fishmeal (Coles & Preston, 1950). The commercial demand for vitamin B_{12} feeding supplements in this country is not therefore high, partly owing to the fish products position and partly because agricultural attention is now focused on antibiotics and the possibility of their release for feeding purposes. Wakelam

Summary

(1) Indications for the operation of caesarean section are described in 26 cases, and the figures of survival of both ewes and lambs are given.

(2) The method of anaesthesia and the technique of operation are described.

(3) The prognosis of the various indications for the operation of caesarean section is discussed.

Acknowledgments.—These cases were seen whilst in practice with Captain Yarrow, of Ludlow.

I should like to express my appreciation to Mr. J. C. Greatorex, Royal Veterinary College, for presenting the data for publication.

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(1952) has pointed out, however, that changes in techniques of storing and marketing fish may render a higher proportion of the catch available for human use and so reduce the amount of material available for animal feeding.

Vitamin B_{12} has been referred to as a component of A.P.F. and it is believed by some that there are other components in addition to the effect in certain supplements attributable to antibiotics. Clear-cut proof of the existence of such further components is not yet available, although Edwards, Cunha, Meadows, Shawver and Pearson (1951) have found that an aureomycin feeding supplement treated with alkali to destroy vitamin B_{12} and aureomycin has still a growth-promoting effect for pigs. In his valuable review of new developments in pig feeding, Duckworth (1952) has suggested that other vitamins may exist in A.P.F. but that their distribution among feeding-stuffs may be very different from that of B_{12}. He points out that the animal has three possible sources of B_{12} beside that added in the ration, *viz.*, intestinal synthesis, soil and fermenting dung. Husbandry factors clearly must exert a considerable influence on the degree to which these sources become available to the chick or piglet. It is certainly at this stage that vitamin B_{12} is required : all the experimental and practical evidence to date suggests that the main benefits from an extraneous supply of the vitamin are derived pre-natally or during the early weeks of life. A finding that must not be overlooked, although its practical significance is not yet clear, is that of Gregory, Ford and Kon (1952), who showed that sow's milk (but not cow's milk) contains a vitamin B_{12}-binding factor.

The use of antibiotics for animal feeding purposes has had a somewhat cautious reception in Great Britain. Doubts have been expressed as to its practical value under our conditions, although these must in part be based on confusion with vitamin B_{12}. It has been suggested that there may be long-term effects of a detrimental nature, *e.g.*, the encouragement of resistant strains of micro-organisms. While, therefore, there are reservations concerning the employment of antibiotics for stock to be used for breeding, the same considerations do not apply to birds or pigs intended for slaughter, and from the pronouncement made by the Agricultural Research Council early in 1952 it would seem that there is a probability that soon the farmer will be able to purchase antibiotic supplements, but not of course therapeutic preparations, direct. It is theoretically possible at the present time for a veterinary surgeon to issue antibiotic feeding supplements on prescription but this practice, unless based on the genuine belief that the antibiotic will rectify some condition detrimental to the animal, is really contrary to the spirit of the present restrictions and is rarely adopted. There are, however, growing grounds for the belief that the antibiotics do in fact act by correcting some underlying and transmissible condition, and if there were only some clinical features that could be recognised the use of relevant supplements at the discretion of the veterinary surgeon might well be justified.

The discovery of this transmissible condition was made by a joint team of workers from the National Institute of Research in Dairying, Shinfield, and Glaxo Laboratories, Greenford (Coates, Dickinson, Harrison, Kon, Porter, Cummins & Cuthbertson, 1952). They found that when procaine penicillin was added to a good practical ration it improved the growth of chicks in a laboratory that had been used for poultry for 10 years. Chicks from the same batch in two other laboratories, where birds had not been kept before, grew equally well on the ration with or without procaine penicillin, and their growth-rate was the same as that on the penicillin supplemented diet in the first laboratory. The depression of growth in the absence of penicillin was not thought to be due to differences in management or to recognisable disease. By transferring chicks from one laboratory to the other presumptive evidence was obtained that the condition was infectious, and while it appeared to spread more readily when " infected " and " uninfected " birds were kept in the same brooder from 14 days of age, it was transferred also from cages in the same room without direct contact between the birds. Cuthbertson (1952) suggests that the condition may best be described as " the inability to grow maximally in the absence of antibiotics " and mentions that it is not transmitted through the egg. He refers to unpublished work by Cummins and himself in which it has been shown that the growth of birds on all-vegetable rations is markedly improved by penicillin even in the absence of the condition already referred to. In unpublished experiments with rats Cuthbertson, Cummins and Thornton (see Cuthbertson, 1952) have shown that whereas penicillin does not appear to have any effect when added to stock rations, it leads to greatly increased growth-rates on vegetable rations, and indeed these may surpass those obtained with the stock diet. There are presumably other factors, besides the infectious condition, to account for the mode of action of antibiotics. It is of interest, however, that Sieburth, Stern and McGinnis (1952) have shown that the feeding of a diet containing a culture of turkey faeces may depress the growth of turkey poults. The effect is not a consistent one, but in birds in which it occurs it may be reversed by the addition of procaine penicillin.

Much painstaking work already has been devoted to the effect of antibiotic feeding supplements upon the bowel or faecal flora, for it is generally assumed that the antibiotics act through some modification of the microbial population of the intestines. Antibiotics administered parenterally do not augment growth (Groschke & Evans, 1950) or do so only when administered in amounts that would probably permit some to enter the gut. While there have been a number of findings of interest, the overall position remains obscure. Such changes as have been detected do not appear to be constant, and the effect from one antibiotic to another is likewise variable. Bridges, Dyer and Burkhart (1952) have not found any significant correlation between total bacterial count of the faeces and growth-rate in pigs receiving various antibiotics, while Rosenberg, Morikawa and Bushnell (1952) have shown that the successful administration of terramycin to young chicks to stimulate growth is not accompanied by the elimination, or any significant reduction in the numbers, of any group of micro-organisms in the faeces.

The varying response of laboratory chicks to antibiotic supplementation is reflected under farm conditions. A similar discrepancy occurs in pigs. In a series of trials the present writer has found considerable variation in the response of pigs from farm to farm and even on the same farm at different times. Nevertheless, there is evidence that in many instances an antibiotic may increase the growth-rate of outwardly normal pigs even when their ration contains 7·5 per cent. of fishmeal. According to the statement issued earlier in the year by the Agricultural Research Council there is, however, little or no benefit when the ration contains 10 per cent. of fishmeal, this statement being based presumably on the findings of Braude, Kon and Mitchell (1951)—see also Barber, Braude, Kon and Mitchell (1952). The application of antibiotics in practice, always subject to their release for feeding purposes, must in the end depend upon the economic results obtained. The cost is not high and, moreover, there seems little point in continuing them in the case of pigs after the animals have attained the age of 16 weeks. Indeed, Bowland and McElroy (1952) have found under Canadian conditions that the incorporation of antibiotics in finishing

rations may lower carcase quality. In Northern Ireland, Robinson, Coey and Burnett (1952) have recently completed some interesting experiments in which they investigated the effect of the restricted feeding practices, often adopted in the United Kingdom, on the response to procaine penicillin. They point out that enhanced appetite is usually a feature of antibiotic treatment, and have demonstrated that the live weight increases obtainable with the use of procaine penicillin are appreciably reduced by restricted scales of feeding.

Whatever the applicability in farm practice of antibiotic supplements in the case of normal or nearly normal pigs there seems little doubt as to the economic advantage of incorporating them in the case of "runt" pigs, at least of certain categories. Shanks (1952) with aureomycin and Worden and Bunyan (1952) with procaine penicillin have obtained excellent responses in this country, the subsequent rates of gain and (in the case of procaine penicillin and probably with aureomycin also) carcase quality being surprisingly good. This is a use of antibiotic feeding supplements that would appear to be a genuine case for veterinary prescription.

Vitamin B_{12} is synthesised in considerable quantities in the rumen and there has been considerable speculation as to whether it or antibiotics will benefit calves in the pre-rumination stage. Such experimentation is admittedly difficult to control, and it is not surprising that the results of trials have been somewhat conflicting. In the case of both aureomycin (Loosli & Wallace, 1951) and penicillin (Knodt & Bloom, 1952), however, augmentation of growth-rate has been claimed, while Rusoff (1951) has found aureomycin of benefit when incorporated in the starter concentrate from 14 weeks of age onwards.

Finally, it is of interest to mention the recent discovery that certain "surface-active agents," including some detergents, are capable of stimulating growth. Ely (1951) reported that the incorporation of lauryl ethylene oxide in the ration stimulated the growth of chicks to a marked degree, while Luecke, Hoefer and Thorp (1952) have reported that Ethomid C/15 (the Ethomids are N-substituted fatty acid amides, the substituents being polyoxyethylene groups) improved the growth-rate of weanling pigs. In a more recent publication, however, Scott, Johnson and Goffi (1952) tested six surface-active agents on chicks with negative results, and in one experiment found that a combination of two of the compounds sharply depressed growth. They noted also that in some instances a high incidence of perosis occurred in chicks fed with these agents. It was previously known that Sorbitan monolaurate and certain other surface-active agents could inhibit the growth of rats (Harris & Sherman, 1951) and clearly these products must be used, if at all, with discretion.

Whether or not antibiotics have any detrimental effects other than the possible creation of resistant strains of bacteria remains to be ascertained. Augmentation of growth when other factors may be present in inadequate amounts may have repercussions, in the sense that it is usually the faster-growing members of a litter that are more likely to become clinical cases of rickets or other deficiency conditions. A brief indication of possible dangers has come from observations on fish. Aureomycin is now incorporated in certain foods for aquarium fish in the U.S.A. and Axelrod (1952) suggests that while definite benefits are obtained there may be a risk of sterility. The evidence for this contention is not published, however, and in any event its validity, if substantiated and applicable to farm livestock, would not be a deterrent in the case of animals intended for slaughter.

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Note added in proof, 23.10.52.—I am grateful to Dr. D. F. Booth, Dr. K. L. Robinson and Mr. J. A. Wakelam for their helpful comments, which include the following: (1) There is considerable variation in the vitamin B_{12} content of commercial fishmeal: in a series of six samples recently submitted for analysis the level ranged from 0·024 to 0·32 microgrammes per g. (2) More recent trials than those referred to by the A.R.C. have shown that a response to antibiotics may be obtained even in the presence of 10 per cent. fishmeal in the ration. (3) The sudden withdrawal of antibiotics from the ration at, say, 100 lb. live weight in pigs may not always be harmless in the sense that definite setbacks in condition sometimes result.

CLOSE SEASON FOR DEER: COMMITTEE'S QUESTIONNAIRE

A questionnaire framed to obtain as much information as possible on the subject of control of deer in Scotland has been prepared for landowners, farmers, crofters, deer stalkers, and gamekeepers and others by the Deer (Close Seasons) Committee recently appointed by the Secretary of State to investigate this matter. The Committee are anxious that evidence should be as widely representative as possible. They hope that those who are interested and are in a position to assist by expressing their views will not hesitate to make application for a copy or copies of the questionnaire. All such information will be treated as being strictly confidential.

Copies of the questionnaire may be had on application to the Secretary of the Committee, Mr. W. O. Watt, Department of Agriculture, St. Andrew's House, Edinburgh, 1.

It will be recalled that the Committee was appointed to consider the desirability of introducing a close season for deer in Scotland and the manner in which, and the safeguards for agricultural and other interests under which, any close season they may recommend should be made effective.

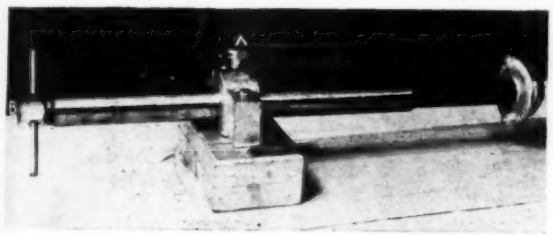
NEW INSTRUMENTS AND APPLIANCES

AN EXTENSION APPARATUS FOR SMALL-ANIMAL ORTHOPAEDIC PROCEDURES

BRENDAN HALPIN, M.R.C.V.S.,
ELTHAM, S.E.

Frequently it has been found that the most difficult part of the treatment of fractures has been the reduction of the over-riding fracture, and its maintenance in the reduced position. We have noticed this particularly in complete femoral and tibial fractures in the larger dogs, especially when there has been a delay of some days since the injury. An assistant extending the limb manually soon becomes fatigued. He cannot apply the gradually increasing pressure which is advisable to overcome the contraction of muscles surrounding the fracture, neither can he maintain the accuracy of extension while internal methods of fixation are applied.

The apparatus illustrated was therefore made. It consists of a bumper-type car jack mounted horizontally in a steel block. A locking screw (A) engages in one of a series of depressions on the body of the jack ; thus a coarse adjustment may be made to fit the largest or the smallest patient. Screwed on to the base plate of the jack is a metal " D " to take tapes, and the hexagon nut (B) has a tommy-bar penetrating it for easy manipulation. The whole is mounted securely on a 36-inch long baseboard, at the other end of which is secured an adjustable strap.



The anaesthetised and prepared animal is placed on the table with the affected limb through the loop of the strap, which is adjusted to produce traction in the axilla or the groin respectively. The limb is secured to the " D " by tapes, either for traction on the limb, as illustrated, or for direct traction on the bone by means of bone forceps. The mechanism is set roughly by drawing the jack through its mounting and setting with the locking screw. Any desired amount of traction can now be obtained by adjustment of the hexagonal nut.

This apparatus, though an improvisation, is an aid in many operations. The limb can be extended gradually and when the fragments of bone are kept in apposition by a clamp, such as Knight's bone clamp, an ideally stable structure is presented for the insertion of pins or screws.

Acknowledgment—My grateful thanks are due to George Passmore, Esq., of Eltham, who was very helpful with the construction of this device.

ABSTRACTS

Intracaudal and Subcutaneous Vaccination of Calves with *Brucella abortus* Strain 19*

Approximately 200 7- to 10-month-old brucella-negative heifer calves were divided into three comparable groups, known respectively as " Intracaudal," " Subcutaneous " and " Control." The intracaudal group was inoculated with 1·0 ml. strain 19 vaccine deep into the fibrous tissue about $\frac{1}{2}$ inch from the tip of the tail ; the subcutaneous group received 5·0 ml. vaccine under the skin in the region of the seventh or eighth rib at the level of the acromion. The viable count of the vaccine was 12×10^9 per ml. During the following two years 13 animals were removed from the experiment leaving 67 in the intracaudal, 62 in the subcutaneous and 64 in the control group. Twelve months after vaccination hand mating with brucellosis-free bulls was commenced. This extended over three months. At the end of this time the pregnant animals were exposed to natural infection.

Blood samples were collected at frequent intervals from all animals and were tested for agglutinins by the Weybridge method. The maximum response in the vaccinated groups occurred at the beginning of the third week after injection. The intracaudal route produced a mean maximum titre almost twice as great as the subcutaneous route. It was noted that the mean maximum titre of older calves was more than 40 per cent. greater than that for younger calves. Seventy-five per cent. of younger calves and 30 per cent. of older calves became negative to the agglutination test within the 12 months after vaccination. Most of those posi ive or doubtful after 12 months remained so after 24 months whether or not they had been exposed to infection.

J. S. P.

* **A Comparison of the Effects of Intracaudal and Subcutaneous Vaccination of Calves with *Brucella abortus*, Strain 19. I.—Maximum Post-vaccination Titres and Persistence of Serum Agglutinins.** GREGORY, T. S. (1951.) *Aust. vet. J.* **27.** 319-325.

* * * * *

Effect of Diet and of Molybdenum on Copper Metabolism in Sheep*

As a result of earlier experiments the author considered that molybdenum exerts some influence on copper metabolism in herbivorous animals and that it is possible to have a pasture with a very low molybdenum but normal copper content, where grazing sheep would acquire an abnormally high copper status owing to the absence of a factor which limits liver copper storage. The present paper describes an experiment designed to elucidate the influence of molybdenum in this respect. Thirty young cross-bred ewes were divided into five groups of six ewes kept in individual pens. These groups were fed chaffed lucerne and chaffed oaten hay ; Group I received pure lucerne, Group V received pure oaten hay, while the intermediate groups were given mixtures of 3 : 1, 1 : 1 and 1 : 3 lucerne to oaten chaff by weight. All ewes were kept on the same copper and molybdenum intakes by calculated additions of copper sulphate and ammonium molybdate to the feed. The experiment lasted for six months, when the ewes were slaughtered and the livers retained for analyses. Results showed quite clearly that the nature of the diet can exert a very definite effect upon the accumulation of copper in sheeps' livers. The ewes receiving the 1 : 1 lucerne-oaten mixture limited liver copper storage to 35 mg., whereas an increase to 135 mg. would have been anticipated

* **The Effect of Diet and of Molybdenum on Copper Metabolism in Sheep.** DICK, A. T. (1952.) *Aust. vet. J.* **28.** 2. 30-33

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had the additional molybdenum been omitted (author's unpublished data). The group receiving lucerne hay alone stored only 9 mg. copper, while those on oaten hay stored 118 mg., showing that, on this diet, the factor preventing copper storage in the liver had almost been eliminated. Thus lucerne apparently contains a factor inhibiting liver copper storage.

During the experiment the level of molybdenum in the blood was determined at weekly intervals, and the mean results are presented in a table. This shows that although the total copper and molybdenum intakes of the sheep were identical, the level of molybdenum maintained in the blood of the oaten hay fed sheep was nearly 10 times as high as those fed on lucerne hay, *i.e.*, 447 μg. per cent. against 48. On the basis of these observations, coupled with results from an unpublished series of experiments, the author states that it has been established beyond doubt that (for this diet mixture) there is a quantitative relationship between the copper intake and the amount of molybdenum which has to be given to prevent the accumulation of liver copper. This knowledge may help to explain some conflicting viewpoints on copper-molybdenum functions.

W. L. S.

REVIEW

[Medical Mycology. An Introduction to Its Problems. By G. C. Ainsworth, B.Sc., Ph.D., F.L.S., Dept. of Botany, University College of the South-West of England, Exeter, Devon. ix + 105 pp. 15s. London: Sir Isaac Pitman & Sons, Ltd. First Edition. 1952.]

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It is intended that this book, which is an introduction to the subject, shall reveal and discuss certain problems. As such it is stimulating and refreshing; the approach is modest and it may be accepted that "No medical mycologist would claim that fungi rank in importance with bacteria and viruses as a cause of disease in man." The importance of the subject, however, concerns the lessons in general pathology and disease which can be learned from the mycoses of man and of animals.

Superficial mycoses are caused by fungi which are normally parasitic on man or animals; they are mild, self-limiting and rarely fatal; ringworm is an example and this is ubiquitous and of great antiquity. On the other hand, the deep-seated mycoses are more often associated with saprophytic fungi and frequently the diseases are severe, progressive and fatal; the subsidiary causes assume prominence and the geographical area, the mode of life and occupation of the patient are of some moment.

There is another corrective awaiting one who reads "... the right interpretation of fungi found in sputum or associated with pulmonary disorders is a matter for experienced judgment. Neither the mycologist nor the clinician alone is usually in a position to come to a correct decision." In these days of specialisation it is as well to apply this to other examinations made for the purposes of diagnosis. The author gives no evidence of having been hampered by a narrow specialist training and other excerpts are quoted: "Mycoses offer numerous examples of diseases associated with more than one pathogen." "It is possible that for torulosis, and perhaps histoplasmosis as for moniliasis infection is influenced by metabolic and other disturbances in the host." This book is worth reading if only because of the amplification of these extracts; it is illustrated and has a comprehensive bibliography and the outlook is good for us as well as for students of medicine.

R.C.V.S. WAR MEMORIAL

The R.C.V.S. 1939-1945 War Memorial has now been carved and is ready to be placed opposite the 1914-1918 War Memorial, to which it is similar in design, in the principal entrance to the Royal College at 10 Red Lion Square.

A ceremony will be held to unveil the Memorial on the afternoon of Friday, February 6th, 1953. As the entrance hall is too small to accommodate the numbers who may desire to be present, the actual ceremony will be held either in the Council Chamber or in some other building in London suitable to the purpose, but this is dependent on the numbers to be accommodated.

A letter has been sent to all the known next of kin of the deceased members. If, however, anyone has not received such a letter, would they communicate with the Registrar, R.C.V.S.

The President is anxious to know the approximate numbers to be accommodated. He would ask, therefore, if anyone who desires to be present would write to the Registrar, R.C.V.S., not later than Monday, November 17th, 1952, if possible indicating whether the writer has any particular connection with any one of the deceased members. When some idea has been reached of the numbers to be present a decision will be made as to the time and place of the ceremony and as to how many can actually be accommodated.

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Lester, L.	Greeves, D. H.
McDougall, K. D.	Howie, A. M.
Morris, L. T.	Lamb, E. M.
Patterson, J. R.	Peyton, A. W.
Rutherford, G.	Taylor, D. W. B.
Urquhart, J. W.	

Died of Wounds	*Died whilst Prisoner of War*
Bhardwaj, V. R.	McCrea, A. G.
Ellis, A. A. B.	Stelle, A. P.

Died on Active Service

Brocklehurst, F. B.	Maclean, B.
Heard, J.	O'Brien, F. N.
Jones, J.	O'Donel, S.
Kelly, A. J.	Orr, W.
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Mr. Iain Macleod: I regret that the information is not available.

Mrs. Mann: Would the right hon. Gentleman try to get the information? I think he will agree that it is very important?

Mr. Macleod: Yes, but deaths attributable to organisms contained in liquid milk are not recorded as a separate form of death in in the general registry.

Mrs. Mann: I appreciate that, but diseases like collapsed vertebrae and bone deficiency may be attributable to bad milk, and as this is very important would it be possible to make enquiries?

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Mrs. Mann (October 22nd) asked the Minister of Health the number of organisms per c.c., permitted in certified milk, "Grade A" milk, and "Grade A (T.T.)" milk including coliform organisms, respectively.

Mr. Iain Macleod: In England and Wales the regulations no longer provide for the designations for milk and the tests referred to in the Question. "Certified" and "Grade A (T.T.)" have been replaced by "Tuberculin Tested." "Grade A" has been replaced by "Accredited" and these grades of milk must comply with a methylene blue reduction test.

Mrs. Mann: Does the reply indicate that the standard has gone up, or that the standard formerly set can no longer be adhered to? To cut matters short, Mr. Speaker, may I ask if the Minister would try to let mothers know that all milk must still be boiled?

Mr. Macleod: I am really anxious to help the hon. Lady, but she must realise that she has asked me a question about a coliform test which does not exist, in relation to three grades of milk none of which exists. In view of that, it is difficult to give a more detailed answer.

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Brigadier Medlicott (October 22nd) asked the Secretary of State for the Home Department if he is aware of the unnecessary suffering caused to unweaned pony foals by their being prematurely taken away from their mares and sold for slaughter; and if he will introduce legislation to prevent a continuance of this form of cruelty.

Sir. H. Lucas-Tooth: My right. hon. and learned Friend has caused enquiries to be made and is informed that the police have no evidence to suggest that unnecessary suffering is caused to pony foals by this means. It is an offence under the Protection of Animals Act, 1911, to ill-treat, or to cause unnecessary suffering to, any domestic or captive animal, and the police would not hesitate to take action if the necessary evidence were forthcoming.

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The Government's policy is to encourage poultry farmers to use those methods of husbandry that are best suited to their holdings.

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Sir Thomas Dugdale, Minister of Agriculture, addressing an agricultural conference at Cambridge, said that in the coming year action might be taken to deal with owners of dogs that worried sheep. Such societies as the R.S.P.C.A. and the Canine Defence League had agreed to encourage the idea that there could be cruelty to sheep as well as cruelty to dogs.

Legislation would be desirable, he said, but there would not be a Government Bill because of the lack of Parliamentary time.

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Re Grassland Conference

Those who have sent slips applying for Conference tickets will receive these in due course, together with a note about luncheon arrangements.

Those who have not yet applied for tickets are reminded that a programme of the Conference was included in the October 18th issue of *The Veterinary Record*. At the bottom of the programme a slip is attached on which members are asked to apply for tickets, etc., to the General Secretary, 36, Gordon Square, London W.C.1.

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PERSONAL

PRESENTATION TO R.S.I. SECRETARY

At a luncheon given by the Council in his honour at the Grosvenor Hotel, London, on October 14th, Dr. J. W. Dudley Robinson, who will be retiring at the end of this year, was presented with an inscribed silver rose bowl and a cheque on behalf of the fellows, members and associates of the Royal Sanitary Institute as a token of their appreciation of his eminent service as Secretary of the Institute since 1928. Dr. Robinson has also been Secretary of the Royal Sanitary Institute and Sanitary Inspectors Examination Joint Board since 1928 and of the National Nursery Examination Board since its formation in 1945.

Among his many activities, Dr. Robinson was concerned with the administration of the funds of the Model Abattoir Society and of the National Health Society, after they were wound up and their assets transferred to the Royal Institute, the funds of the first-named providing for the Institute's annual Benjamin Ward Richardson Lecture.

In addition to organising the annual Health Congresses of the Royal Sanitary Institute, which are attended by upwards of 2,000 delegates, he also organised a number of special conferences—notably on the administration of the Milk (Special Designations Order) in 1936.

During his service with the Royal Sanitary Institute, Dr. Robinson has been responsible for its examination system under which some 68,000 candidates have been examined. In the same period, the membership of the Royal Institute increased from 4,700 to well over 9,500. In 1950 he was appointed an officer of the Ordre de la Santé Publique by the President of the French Republic.

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University of Edinburgh Doctorate.—At a graduation ceremonial on October 25th, 1952, the University of Edinburgh conferred the Degree of Doctor of Philosophy in the Faculty of Science upon Charles Stuart Grant Grunsell, M.R.C.V.S. The title of his thesis is "Studies of the Blood and Marrow Picture in Ruminants, especially Sheep."

Dr. Grunsell is a past student of the Royal (Dick) School of Veterinary Studies, Edinburgh, and is at present a Lecturer in the Department of Veterinary Hygiene and Preventive Medicine in the School.

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Births.—BOWMAN.—On October 21st, 1952, to Susan, wife of R. W. Bowman, B.SC., M.R.C.V.S., 4, Finchale Road, Durham, a son.

MITCHELL.—On October 7th, 1952, at Bottoms House, Savile Road, Dewsbury, Yorks, to Freda, wife of David Mitchell, M.R.C.V.S., a daughter.

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Marriages.—DENHAM—MACMICHAEL.—On August 28th at St. Blasius, Shanklin Old Church, by the Rev. Canon G. MacMichael, Peter Gordon, elder son of Mr. and Mrs. W. W. Denham, Upper Shide Mill House, Newport, I.o.W., and Esther Mary, only daughter of Mr. and Mrs. E. T. MacMichael, Woodcote Lodge, Wimbledon Common, S.W.19.

JOHNSON—GREENLEAF.—On October 20th, 1952, at St. Anne's Catholic Church, Margate, Robert Harry, only son of Mrs. F. Johnson, 20, Dee Road, Connah's Quay, to Margaret Mary, youngest daughter of Mr. and Mrs. A. Greenleaf, 12, Clarendon Road, Margate.

WYLLIE—SUTHERLAND.—On September 6th, 1952, at St. John's Church, Hampstead, Donald C. Wyllie to Audrey M. B. Sutherland, M.R.C.V.S.

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R.C.V.S. OBITUARY

LITTLE. Alexander Campbell Wishart, M.C., M.R.C.V.S., Lecturer in Veterinary Bacteriology at the Royal (Dick) School of Veterinary Studies, Edinburgh. Graduated Edinburgh, July 13th, 1935. Died October 23rd, 1952; aged 53 years.

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Mr. A. C. W. Little, M.C., M.R.C.V.S.

AN APPRECIATION

(Contributed)

There must be many former students of the Royal (Dick) to whom the news of the sudden death of Mr. A. C. W. Little, M.C., M.R.C.V.S., means a very real sense of grief. An Edinburgh man by birth, Mr. Little had intended to make the Army his career but after some years of military service, during which he won the M.C., he was invalided out of the Army. At an age when many men have their life's path clear before them, Mr. Little started again by entering the Royal (Dick) Veterinary College. After he qualified in 1935 Mr. Little settled down to make veterinary bacteriology his chosen course. As the years went by Mr. Little came more and more to be esteemed by staff and students as an invaluable member of the Department of Veterinary Bacteriology.

He had a happy knack of presenting his material in a clear manner, devoid of unnecessary frills, that enabled any student but especially junior students to acquire a clear and comprehensive grasp of the subject. By nature a hard worker, no trouble was too great if it would help a class or an individual student. Mr. Little had many qualities that endeared him to his colleagues. He had a wide knowledge of his subject that was always available to those who sought his advice.

Of a quiet disposition Mr. Little had a happy nature and was devoted to his family; for many years the family spent their holidays in Perthshire where the father could enjoy his favourite pastime of fishing.

For some years Mr. Little had not enjoyed very good health; twice within the past year he had undergone quite serious operations to relieve a very painful condition of one knee. The weeks following the second operation entailed a great deal of pain but all this was met with quiet courage and calm confidence. Those who were privileged to visit him in hospital carried away a mental picture of a very gallant gentleman, who through all his difficulties remained cheerful. In the last few weeks the knee had begun to show promise of recovery. On Thursday morning of last week when going up the entrance steps to the College Mr. Little was seen to collapse; within a few moments he was dead.

All members of the staff and students who knew him well wish to extend their very real sympathy to his widow, son and daughter who may well derive comfort from the expressions of esteem and affection that have been so widely voiced.

The funeral took place at Warriston Crematorium on Saturday and was attended by a large number of the staff and students of the Royal Dick.

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THE LATE MR. FRANK H. SUGDEN, M.R.C.V.S.

Mr. Frank Haigh Sugden, of Stanton House, Grantham, whose death we recorded last week with much regret, was a Yorkshireman who, before going to Grantham, where he practised for 43 years, practised in Knaresborough and Huddersfield.

The *Grantham Journal* says of him: "Mr. Sugden's professional career extended from 1904 until his retirement last March, and in these years he won the friendship of a wide circle of friends, who greatly enjoyed his gift as a raconteur.

"He was always ready with advice and help, and, intensely interested in farming, he was a great advocate of farmers growing their own food for their stock.

"His other love was steeplechasing, and his little horse 'Frankie' (Franklin-Zerlina) will be remembered from pre-war days. He won 13 races with him."

Mr. Sugden was married in 1905 at Almondbury church, Huddersfield, and his wife died eight months ago. He leaves a son and daughter.

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ROYAL ARMY VETERINARY CORPS

The following announcements are made in recent issues of *The London Gazette (Supp.)*:—

Emergency Commissions.—Lieut. (War Subs. Capt.) A. Wilson relinquished his commission October 8th, 1952, and is granted the honorary rank of Captain.

R.A.R.O.—Major (Hon. Lieut.-Colonel) John Arthur Langley, retired, late R.A.V.C., to be Major, August 6th, 1952.

T.A.R.O.—Lieut. N. St. G. Hyslop from Active R. Sigs. to be Lieut., May 30th, 1952, retaining his present seniority.

Captain G. B. Lewis from R.A., T.A. Reserve of Officers, to be Captain, October 22nd, 1952, retaining his present seniority.

Captain H. G. L. Harvey from R.A., T.A. Reserve of Officers, to be Captain, October 22nd, 1952, retaining his present seniority.

Lieut. G. G. McLaren from R.A., T.A. Reserve of Officers, to be Lieut., October 22nd, 1952, retaining his present seniority.

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LEGAL NOTES

S.V.R. Applicant's Appeal Allowed

In the High Court of Justice on October 23rd, the Divisional Court (Mr. Justice Finnemore and Mr. Justice McNair) allowed the appeal of Mr. Henry David Simpson Hamilton, of Larkfield House, Otley Road, Harrogate, from the decision of the Council of the Royal

College of Veterinary Surgeons refusing an application by him for registration in the supplementary register.

Mr. Hamilton's application was made under section 6 of the Veterinary Surgeons Act, 1948, which provides that any person shall be entitled to be registered if he satisfies the Council (*a*) that he is of good personal character, and (*b*) that during the 10 years immediately preceding the application he has for a period of not less than seven years in the aggregate been engaged in the United Kingdom, as his principal means of livelihood, in diagnosing diseases of animals and giving medical or surgical treatment to animals.

The Council said that they were not satisfied that Mr. Hamilton was of good personal character or that the requirements of condition (*b*) were fulfilled by him.

Mr. Granville Sharp, Q.C., and Mr. H. Evans appeared for the applicant; Mr. Ashe Lincoln, Q.C., and Mr. Robert Fortune for the Council.

Judgment

Mr. Justice Finnemore, in giving judgment, said (reports *The Times* in its issue of October 24th) that Mr. Hamilton was the stepson of a member of the Royal College of Veterinary Surgeons. He had served in the Navy in the first world war and finally retired in 1926 with the rank of lieut.-commander. He then assisted his stepfather in his practice as a veterinary surgeon, and after his stepfather's death, for at least seven years, he had been taking an active part in the work, which was still being carried on with the assistance of a qualified veterinary surgeon. In 1949 Mr. Hamilton applied to be put on the supplementary register. He gave the necessary particulars and submitted four references which spoke of his character in high terms.

His Lordship then traced the course of the proceedings after the appellant's application had been received and gave details of the hearing before the Council. Continuing, he said that strong comments had been made on behalf of the appellant on the way the case had been conducted before the Council and the suggestions made were as strongly repudiated on behalf of the Council. It was not for the Court, said his Lordship, to go out of their way to blame people who were trying to carry out their difficult duties, and who no doubt usually carried them out efficiently, but some of the things that happened at the hearing before the Council were very unfortunate. The Council were a quasi-judicial body carrying out important functions and they ought to carry out their duties in a judicial manner.

It was the duty of the Council, for instance, if a document were disclosed, that it should be shown to the applicant. That was not done in the present case, which he (his Lordship) thought most unfortunate—particularly in the case of two letters in contradictory terms written by the veterinary surgeon who was associated with Mr. Hamilton, in one of which he said that since he (the writer) had been in control of the practice Mr. Hamilton had been diagnosing and treating animals, and in the other that he was doing nothing more than cleaning the kennels and looking after the dogs. The writer was cross-examined on those letters, and the Council took the view that his evidence should be accepted in preference to that of Mr. Hamilton. It was difficult to see how they came to that conclusion when they had before them those two letters, each contradicting the other.

With regard to the finding of the Council that they were not satisfied that Mr. Hamilton was of good personal character, there was not one shred of evidence against his character, and how any people who had applied their minds to the case could have arrived at such a conclusion completely passed his (his Lordship's) powers of imagination.

No piece of evidence and not a single document which had been disclosed in the case suggested that he was a man of anything but the highest character against which not a word could be said. Nevertheless, there was that finding, and what the Council could have had in mind he (his Lordship) did not know. It would be a sad thing that, if when a litigant failed in the opinion of the tribunal before whom he was appearing to prove his case, he should be branded as a person of bad character. The proceedings in the case were in many respects very unsatisfactory.

The Court, with proper evidence before them, were entitled to overrule the Council's decision on questions of fact, and they had come to the conclusion that, on the evidence which was given, the appeal must be allowed.

Mr. Justice McNair said that the Council were charged by Parliament with the performance of very important public duties which, he had no doubt, they performed as a rule to the satisfaction of everyone concerned. In the present case the circumstances disclosed that the proceedings before the Council were not conducted in a manner which gave Mr. Hamilton a fair hearing, and they were compelled to review the whole of the facts. Having done that he was completely satisfied that there was no evidence on which any Court could come to the conclusion that they were not satisfied that Mr. Hamilton was a person of good personal character. The whole of the evidence was the other way on that point, and the evidence was also overwhelmingly in his favour on the second point decided against him. In his judgment the two findings should be reversed and contrary findings made by the Court, with the result that Mr. Hamilton's name would be entered on the supplementary register.

Solicitors: Messrs. Hunters for Messrs. Kirby, Son and Atkinson, Harrogate; Messrs. Geo. Thatcher and Son.

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ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Anthrax:

Berks.—Dunmore Allotments, Abingdon (Oct. 23rd).
Cambs.—56, North Road, Land Settlement Estate, Great Abingdon, Cambridge (Oct. 23rd).
Devon.—Highertown Farm, Tavistock (Oct. 20th); W. H. Knowles, Lower Ashleigh Farm, Tiverton (Oct. 22nd); Silk House, Drewsteignton, Exeter (Oct. 23rd).
Essex.—Olivers Farm, Maldon Road, Witham; Sutton Bridge Farm, Sutton Road, Rochford (Oct. 20th); Church End, Rickling, Newport (Oct. 21st); Butteries Farm, Southchurch (Oct. 23rd).
Kent.—Barn Gate Farm, St. Clere Hill Road, West Kingsdown, Sevenoaks (Oct. 18th); Ashley Cottage, Lymbridge Green, Stowting, Ashford (Oct. 20th); Westfield's Farm, Addington (Oct. 21st); "Twinfirs," Four Elms, Edenbridge (Oct. 22nd).
Lancs.—Cuerden's Farm, Wigan Road, Leyland (Oct. 20th); Beech Grove Farm, Eaves, Woodplumpton, Preston (Oct. 21st).
Leics.—Leicester City Farms, Keepers Lodge Farm, Beaumont Leys (Oct. 20th).
Norfolk.—Church Farm, Ashill, Thetford; Manor Farm, Sparham, Norwich (Oct. 22nd).
Renfrews.—Pennyfern Farm, Greenock (Oct. 22nd).
Salop.—Lower Lea Farm, Bishop's Castle (Oct. 17th); Belton Hall Farm, Market Drayton (Oct. 18th).
Somerset.—Grove Farm, Castle Cary (Oct. 18th); Southview Farm, Tickenham, Clevedon (Oct. 21st); Lower Bagborough Farm, Evercreech; Meeting House Farm, Wrington (Oct. 22nd).
Staffs.—Field House Farm, Eccleshall (Oct. 22nd); Sandon Farm, Sandon, Stafford (Oct. 23rd)
Suffolk.—Abbey Farm, Cockfield, Bury St. Edmunds; Low Farm, Framsden, Stowmarket (Oct. 18th); Grassmere Farm, Little Cornard, Sudbury (Oct. 23rd).
Surrey.—Lodgelands Farm, Ockley Road, Beer Green, nr. Dorking; Mogador Point Farm, Lower Kingswood, Tadworth (Oct. 22nd).
West Lothian.—Whitedale Head Farm, Whitburn, Bathgate (Oct. 21st).
Westmorland.—Bryan Houses, Winster (Oct. 20th).
Wilts.—Tadpole Farm, Blunsdon, Swindon; Temple Farm, Rockley, Marlborough (Oct. 18th); Brail Farm, Great Bedwyn, Marlborough (Oct. 20th); Sands Farm, Oak Lane, Easterton (Oct. 21st.); The Plain Farm, Easton Grey, Malmesbury (Oct. 22nd).
Worcs.—Tilesford Farm, Trockmorton, Pershore (Oct. 22nd); Gorse Farm, Broadway (Oct. 23rd).
Yorks.—New Close Farm, Dacre Top, Summerbridge; Old Field Farm, Honley, Huddersfield (Oct. 17th); Oakview Farm, Plompton, Knaresborough (Oct. 18th); New Causeway Farm, Pateley Bridge, Harrogate; Hesley Hall, Rathwell (Oct. 21st).

Fowl Pest:

Essex.—Woodfield and Woodside Poultry Farms, Hyde Wood Lane, Rochford (Oct. 23rd).
Hereford.—Hillcrest, Hagley, Bartestree (Oct. 19th).
Kent.—Molt House Farm, Green Street Green, Dartford (Oct. 23rd).
Norfolk.—Great Durham Hall, King's Lynn (Oct. 22nd).
Sussex.—Willow Rose, Ovingdean, Brighton (Oct. 20th).

Swine Fever:

Essex.—Writtle Park, Highwood, Chelmsford (Oct. 23rd).
Flints.—Glanrafon, Llanasa, Holywell (Oct. 20th); Penisadre Farm, Prestatyn (Oct. 23rd).
Lincs.—Keal Farm, South Ormsby, Louth (Oct. 23rd).
Midlothian.—Windyvale, Meadowplace Road, Edinburgh, 12 (Oct. 25th).
Norfolk.—East Hall Farm, Munford, Thetford, Norfolk (Oct. 25th).
Stirlings.—Polmaise Home Farm, St. Ninians, Stirling (Oct. 21st).
Suffolk.—The Hall, Charsfield (Oct. 20th).
Westmorland.—East View, Drybeck, Appleby (Oct. 25th).
Yorks.—Gooseacre Allotment, Thurnsore, Rotherham (Oct. 20th).

THE ANTHRAX POSITION

The number of cases of anthrax, especially amongst sows in East Anglia, continues to cause much anxiety. In the first nine months this year there were 663 cases, involving 741 animals, reported. This takes us back almost to the high level of 1939 (699 cases, involving 792 animals, for the complete year). Stock owners are advised that, in the circumstances, any sudden and unaccountable death among farm stocks should arouse suspicion of anthrax.

Nor should it be forgotten that the Anthrax Order of 1938 places on the owner the duty of detaining for official inspection the carcase of any animal suspected of dying from anthrax, and a breach makes him liable to a fine of £50 and, in certain circumstances, a month's imprisonment.

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

"TUBERCULOSIS VERRUCOSA CUTIS" IN VETERINARY SURGEONS

Sir,—While I was an assistant in general practice in Dorset I developed a skin disease on my right elbow and left thumb; it spread slowly during a period of several years. At times it looked like a warty condition, at other times fungoid. The lesion on my thumb frequently was quite painful and intermittently discharged a certain amount of pus. I consulted several members of the medical profession and had it diagnosed as psoriasis, cow warts, ringworm and "one of these obscure infections you vets. get."

When I was in Glasgow prior to coming out here I went to see a skin specialist and he immediately diagnosed it as "tuberculosis verrucosa cutis probably of bovine origin" and confirmed his diagnosis with a biopsy. Treatment consisted of calciferol ung. locally and pills internally and one treatment with a chromocytic lamp. The condition was clearing up fairly quickly when I had to leave for Africa; however, the wearing of short sleeved shirts seems to have let the sun's rays complete the cure and my skin is now all right after a period of about four years.

I write about this as I have not read anything about this condition as an occupational disease of veterinary surgeons and the specialist I saw says that most of his cases are either in veterinary surgeons or farm workers.—Yours faithfully, Duncan C. Scott, Veterinary Officer, Kaballa, Sierra Leone. *October 9th*, 1952.

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"AUTOGENOUS VACCINE THERAPY IN DISTEMPER AND HARD PAD"

Sir,—The reference contained in Miss McLelland's letter to Dr. Crofton's theory that virus and bacterial activities are different phases of the same organism raises a point of some considerable interest. The idea that a possible connection might exist between bacteria and viruses has of course attracted attention for a number of years and in Russia in particular a great deal of research has been carried out in this connection. It was in that country in 1949 that Professor Boshyan published the result of his work under the title "The origin of viruses and microbes" and this book is considered in Russia as introducing a new era in bacteriology. According to Boshyan each filterable virus has a crystalline and a bacterial form and the metamorphosis crystal→virus→bacteria is to be regarded as constantly taking place. Moreover, since in certain cases the crystalline form may be regarded as a refuge from unfavourable conditions, the metamorphosis also takes place in the reverse order, viruses and bacteria becoming crystals in time of stress. It should be noted that the theory also postulates a regular series of bodily changes in the bacterial form of the virus.

In the light of this teaching a number of virus diseases have been re-examined and in September, 1951, Cherkasski published a paper on canine distemper. (*Veterinaria*, No. 9. 1951.) The article, which is illustrated, describes the appearance of the virus as it appears under the electron microscope and also the crystalline and bacterial forms, the latter starting life as gram-positive polymorphous granules, passing through coccoid and other forms before finally becoming large oval yeast-like cells which impart a rosy pigment to the culture. In spite of this it must be admitted that Cherkasski's paper is something of a disappointment for while the purely bacteriological matter is described in detail and in conformation with the Boshyan theory, little attempt has been made to work out the serological and other implications of these findings: perhaps time was short.

The Boshyan theory is of course revolutionary and represents a fundamental departure from the canons of bacteriology as they have hitherto been recognised: it should be regarded with the greatest caution and scepticism at the present stage.—Yours faithfully, R. H. A. Merlen, Royal Veterinary College, Royal College Street, London, N.W.1. *October 21st*, 1952.

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TREATMENT OF PAPILLOMATA

Sir,—The value of "Anthiomaline" in the treatment of bovine papillomata appears to be strongly indicated in such cases as Mr. Fraser describes in his letter of October 10th. I would suggest, however, that this value is strictly confined to such cases, *i.e.*, where the site of the neoplasm renders surgical removal hazardous. Otherwise, I submit, surgical removal is the method of choice, being cheaper to the client and to the practitioner both in material and travelling expenditure. Failures in surgical treatment of papillomata seem to arise when these neoplasms are not allowed to mature sufficiently. When properly pedunculated, they are very readily removed with a Burdizzo castrator, scissors being used for trimming. The condition is extremely common in this area, and I have been led to the conclusion that sensitivity and vascularity decline greatly as pedunculation progresses. Some very massive growths, so extensive, for instance, as to cover the whole of the belly, have been removed with merely the Burdizzo, scissors and suitable restraint. Except in one case, where removal was effected before pedunculation was sufficiently advanced, there was no evidence of recurrence.—Yours faithfully, Denis Branagan, Trumisgarry, Lochmaddy, Isle of North Uist. *October 21st*, 1952.

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THE DESIGNATION "GELDING."

Sir,—The "one final question" put to me by Mr. Begg is rather pointless. I sent him a copy of my report to the owner of the cob, and I understand that it has now been sold under the designation given it by the member who castrated it, and by me.

To classify a horse as a "rig" because at times it snapped when being groomed under its belly, in the absence of any indication that castration has not been complete, is utter nonsense.

In view of the method used at the time of castration, I am more than ever convinced that to classify it as a gelding was correct.

I do agree with the concluding sentence of the fourth paragraph of Mr. Begg's letter, and at the risk of being considered old-fashioned consider that the wooden clamp—or iron and clamp—are the safest methods to ensure complete castration and dispensing with the risk of subsequent haemorrhage. The late Mr. R. Hudson, of Retford, use to castrate standing under a local anaesthetic, using the hot-iron and clamp.—Yours faithfully, J. F. D. Tutt, "Rothiemurchus," Winchester. *October 25th*, 1952.

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REPORT OF THE COMMITTEE ON LICENCES

Sir,—If ever there was a case of "whistling in the dark" we have it in the letter of the group of small-animal veterinarians replying to Major Kirk. I think that most small-animal practitioners will echo my appeal to them to tell us the reasons for their optimism about the future. It appears from their joint letter that they base this conclusion mainly on the fact that they each have busy practices with near-by clinic competitors.

I fully endorse the conclusions of Major Kirk that the uncontrolled spread of animal welfare clinics represents an ever-growing and very serious menace to private small-animal practice. Large-animal practice has been saved for the time being by partial nationalisation but private small-animal practice is in danger of gradual extinction at the hands of animal welfare monopolies.

Thus there is nothing in the present situation to prevent the ultimate saturation of every populated area in the country by so-called "poor people's clinics." It is true we have a limited say as to where clinics should be opened by one society, but this simply means that if we prevent the best society opening up we leave the field open for the worst. The only factor impeding the rapid flooding of the country with clinics, with its consequent impoverishment of small-animal practitioners as a whole, is the lack of the necessary lavish development funds. Such funds are being feverishly accumulated.

I consider that this question should take priority on the agenda of every Division of the B.V.A. and suggest that much more could be done actively to combat this development by both the B.V.A. and the R.C.V.S.—Yours faithfully, John M. Mitchell, 1202, London Road, Norbury, London, S.W.16.